

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of)	
)	
The Development of Operational Technical)	WT Docket No. 96-98
and Spectrum Requirements for Meeting)	
Federal, State and Local Public Safety)	
Communications Requirements Through the)	
Year 2010)	
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**COMMENTS OF THE NATIONAL ASSOCIATION OF COUNTIES AND
THE U.S. CONFERENCE OF MAYORS**

Counties
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Jeffrey D. Arnold
Deputy Legislative Director
National Association of

440 First Street, N.W.; Suite

Washington, D.C. 20001
TEL: 202.942.4286

Tom Cochran
Executive Director
The U.S. Conference of Mayors
1620 Eye Street, N.W.
Washington, D.C. 20006
TEL: 202.293.7330

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SUMMARY

The National Association of Counties (NACo) and The U.S. Conference of Mayors (USCM) represent local elected officials across the country. Our comments are intended to accentuate the importance of maintaining adequate spectrum for a range of technologies, both those available today and those that may be developed in the future. NACo and USCM support the proposed revisions to the public safety 700 MHz band plan submitted by the National Public Safety Telecommunications Council (“NPSTC”) which would allow public safety users the flexibility to deploy either wideband or broadband systems based on their specific needs.

The existing 700 MHz public safety band plan was crafted to effectively meet the unique voice and data needs of public safety by providing a combination of 12 MHz of spectrum for narrowband channels and 12 MHz for wideband channels. To provide both flexibility and full interoperability, the Commission identified channels for general use, interoperability, and reserve spectrum. This combination provides licensees flexibility to deploy a variety of technologies to best meet their needs, within the constraints of the spectrum available, while ensuring support for common channels to provide the highest level of standards-based interoperability.

Since the adoption of the original band plan, there has been growing public safety interest in the benefits of data and video as a supplement to more traditional voice systems. NACo and USCM support providing flexibility to allow public safety agencies to aggregate wideband channels beyond 150 kHz to enable the deployment of broadband systems based on the needs of the particular public safety user or region rather than a particular vendor’s technology. It is important to note, however, that there are significant tradeoffs in choosing to deploy wideband or broadband technologies, but those should be weighed by the local elected officials based on the best advice of their public safety professionals.

Public safety agencies operate in a wide range of environments, from dense urban population centers to sprawling suburban areas to sparsely populated mountainous regions, and require communications throughout all of these terrains. Accordingly, the requirements of a public safety telecommunications system vary greatly and there is not a simple, one size fits all communications system or configuration that meets public safety's wide variety of needs.

Systems must provide a balance among many factors including coverage, data rate, interoperability requirements, reliability, compatibility with current systems and cost. Given these variations, different users are likely to prioritize the tradeoffs among wideband and broadband differently. It is important that the Commission continue to provide the capability for wideband, as well as add the option for broadband.

In contrast to the plan submitted by NPSTC, Lucent's proposal limits public safety's technology choice to just broadband, providing users no flexibility to choose a best-fit solution. As indicated above, public safety's needs vary. In some situations, broadband technologies may be ideal to meet certain public safety agencies' needs; however, in other situations, wideband technologies may be more appropriate. Lucent's proposal advocates that the Commission modify the rules such that users have no option but to deploy broadband systems in the 700 MHz data spectrum. NACo and USCM do not support such an approach because it ignores the reality of the differences between wideband and broadband systems.

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**COMMENTS OF THE NATIONAL ASSOCIATION OF COUNTIES AND
THE U.S. CONFERENCE OF MAYORS**

The National Association of Counties (NACo) and The U.S. Conference of Mayors (USCM) hereby submit these comments in response to the Eighth Notice of Proposed Rulemaking in the above-captioned proceeding.¹ In this phase of this proceeding, the Commission is seeking comment on whether the channeling plan for the existing twenty-four megahertz of public safety spectrum at 764-776 MHz and 794-806 MHz (“700 MHz public safety band”) should be modified to accommodate broadband communications systems.

As further discussed below, NACo and USCM support the proposed band plan submitted by the National Public Safety Telecommunications Council (“NPSTC”). This plan would modify the FCC’s rules so that Regional Planning Committees (“RPCs”) and the public safety users that they represent can choose to deploy either wideband or broadband systems based on their specific needs. The NPSTC band plan also incorporates guard bands, which are essential to provide interference protection to

¹ *The Development of Operational, Technical, and Spectrum Requirements for Meeting Federal, State, and Local Public Safety Communications Requirements Through the Year 2010*, Eighth Notice of Proposed Rulemaking, 21 FCC Rcd 3668 (“8th NPRM”).

narrowband channels. NACo and USCM opposes the recommendations submitted by Lucent, which would mandate the use of broadband technology and leave users with no flexibility in the selection of wideband or broadband systems.

I. Introduction and Summary

NACo and USCM believe that emergency first responders should have access to reliable and interoperable communications which meet their specific needs. NACo and USCM represent local elected officials across the country. Our comments are intended to accentuate the importance of maintaining adequate spectrum for a range of technologies, both those available today and those that may be developed in the future.

In February of 2006, NPSTC submitted a plan incorporating guard bands to help protect existing narrowband channels. The NPSTC plan also included the availability of wideband interoperability channels while providing flexibility to implement broadband systems. The NPSTC proposal, which was vetted throughout the public safety community, provides users with some additional flexibility in deploying broadband and wideband operations while still providing spectrum for wideband interoperability. Accordingly, NACo and USCM support adoption of the 700 MHz rechannelization proposal submitted by NPSTC.

II. Local Elected Officials Believe There Must Be Flexibility To Implement Broadband And Wideband Operations Which Will Allow Public Safety Entities To Deploy Systems That Best Meet Their Needs.

The existing 700 MHz public safety band plan was crafted to effectively meet the unique voice and data needs of public safety by providing a combination of 12 MHz of spectrum for narrowband channels and 12 MHz for wideband channels.² To provide both flexibility and full interoperability, the Commission identified channels for general

² One-half of the wideband allocation was designated by the FCC to be held in reserve in order to accommodate future needs for narrowband, wideband, or broadband that may be identified through the regional planning process or developments in technology.

use, interoperability, and reserve spectrum.³ This combination provides licensees flexibility to deploy a variety of technologies to best meet their needs, within the constraints of the spectrum available, while ensuring support for common channels to provide the highest level of standards-based interoperability.

Dual band digital mobiles and portables that can operate in both the 700 MHz narrowband channels and in the 800 MHz band. These dual band mobiles and portables provide public safety with the option to include 700 MHz band capability when deploying new or upgraded 800 MHz units. NACo viewed a very successful trial of a wideband 700 MHz system with Pinellas County, Florida conducted by Motorola. The wideband trial tested the wideband technology in an actual public safety operational environment, providing high speed data and supporting video applications. Accordingly, technology is currently available for the band and there has been significant progress in seeding the base of dual band 700/800 MHz portable and mobile radios so that the 700 MHz band can be fully utilized to meet capacity and interoperability requirements as broadcast television stations are cleared from the band.

Since the adoption of the original band plan, there has been growing public safety interest in the benefits of data and video as a supplement to traditional voice systems. Over the last year or so, public safety has also increased its focus on broadband technology as one of the potential solutions to provide data and video. NACo and USCM have consistently supported the need for public safety to have access to spectrum for wide area broadband systems. While NACo and USCM do not believe that the current allocation of spectrum is sufficient to fully meet the needs of public safety, as we have expressed repeatedly over the years, we support providing flexibility to allow public safety agencies to aggregate wideband channels beyond 150 kHz to enable the

³ The FCC designated 12.5 MHz of spectrum for general use (which consisted of 7.7 MHz for narrowband use and 4.8 MHz for wideband), 2.6 MHz for nationwide interoperable communications (which consisted of 0.8 MHz for narrowband interoperability and 1.8 MHz for wideband interoperability), and 6 MHz for reserve (0.6 MHz reserved for narrowband; 5.4 MHz for wideband).

deployment of broadband systems based on the needs of the particular public safety user or region.⁴ It is important to note, however, that there are significant tradeoffs in choosing to deploy wideband or broadband technologies.

Public safety agencies operate in a wide range of environments; from dense urban population centers to sprawling suburban areas to sparsely populated mountainous regions, and require communications throughout all of these terrains. Accordingly, the requirements of a public safety telecommunications system vary greatly and there is not a simple, one size fits all

communications system or configuration that meets public safety's wide variety of needs.

Systems must provide a balance among many factors including coverage, data rate, interoperability requirements, reliability, compatibility with current systems and cost.

Given

these variations, different users are likely to prioritize the tradeoffs among wideband and

broadband differently. It is important that the Commission continue to provide the capability for

wideband, as well as add the option for broadband. Therefore, NACo and USCM support the NPSTC proposal which offers RPCs and users the option to determine whether wideband or broadband technologies best meet their needs.

In contrast to the plan submitted by NPSTC, Lucent's proposal limits public safety's technology choice to just broadband, providing users no flexibility to choose a best-fit solution. As indicated above, public safety's needs vary. In some situations, broadband technologies may be ideal to meet certain public safety agencies' needs; however, in other situations, wideband technologies may be more appropriate. Lucent's proposal advocates that the Commission modify the rules such that users and RPC's

⁴ If given this flexibility, the 700 MHz Regional Planning Committees and the public safety users who comprise those committees, would determine whether wideband and/or broadband technologies would be deployed in a particular geographic area.

have no option but to deploy broadband systems in the 700 MHz data spectrum. NACo and USCM believe this is shortsighted and not flexible enough to meet public safety needs because it ignores the reality of the differences between wideband and broadband systems.

III. Their Significant Tradeoffs To Be Weighed By Local Elected Officials And Their Public Safety Agencies

In our view, there are at least four areas where a user must consider the tradeoffs associated with the decision to deploy wideband or broadband technologies, or some mixture of

both: 1) coverage, 2) data rates, 3) accommodation of multiple agencies, and 4) interoperability.

The considerations associated with each of these factors are discussed throughout these comments.

A. Coverage

Coverage is a critical consideration that factors into every public safety system deployment. Public safety responders must be able to communicate in remote or sparsely populated areas that are often not served by commercial systems. In comparing different data solutions, public safety users will need to balance data rates or throughput with the amount of infrastructure needed to provide coverage over the needed area of operation. Local officials do not want to be in a position to suggest parts of their jurisdiction should not receive adequate coverage. For mobile coverage, LMRS industry has told our officials that, a broadband system requires five times the number of transmit sites as a wideband system to provide equivalent reliability. For local zoning officials this must be weighed into any decision. The Commission should provide users with the option to decide between wideband and broadband to meet their current and expected needs and factor this in when local officials are developing their communications system budgets.

B. Data Rates

Another tradeoff that must be confronted when choosing between wideband or broadband systems is the data rates that can be achieved by either system. Broadband systems provide higher data rates than wideband systems because they utilize more spectrum bandwidth per channel. When considering data rates, it is important to remember that both wideband and broadband systems exhibit “peak” and “average” data rates. Peak rates, which are typically quoted in non-technical information, are generally the fastest rate that a user would experience in an ideal environment, *e.g.*, strong signal conditions with virtually no interference that would require transmission “retries.” The average rate is the rate most likely to be experienced under normal conditions of signal strength, loading, etc.

The other technology factor is the rate of decline in data rates as the user moves away from the transmitting tower. EVDO is optimized for data rates very near a transmitter site but data rates drop off quickly as the user moves away from the tower. However, in order to minimize the number of sites (as mentioned above to reduce interference potential) the coverage per site needs to be optimized. This introduces another factor to consider – data rates near the coverage fringe which represent the lowest data rate of a system design.

In addition, systems exhibit an outbound rate and an inbound rate, which are not necessarily the same speed. The outbound rate refers to the data rate of the information traveling the path from the base transmitter out to the mobile or portable unit. The inbound rate refers to the rate of the information traveling from the mobile or portable back to the base transmit site. Most broadband technologies used by public carriers are optimized for outbound transmissions to the cell phone.

C. Accommodation of Multiple Agencies

Typically, public safety agencies have needed to maintain some level of control over their communications systems. Unfortunately, as has been demonstrated by work of the SAFECOM project, this can be one of the most challenging aspects of interoperability. Most agencies own and operate their own system on channels licensed to that agency.

In more recent years, larger statewide systems have been built to serve both the state and any multiple agencies who agreed to have their communications needs be met by sharing the state system. Some examples include the State of Michigan and the State of Utah, both successful 800 MHz systems. Given the limited amount of spectrum available, we believe wideband channels will provide greater flexibility for accommodating multiple systems, while broadband deployments may be better suited to shared systems offering access to all agencies in a given area.

Therefore, as local elected officials and their public safety users weigh whether to choose wideband or broadband systems, another factor that may come into play is the direction that the choice dictates with regard to individual versus shared control. Under the band plan that NPSTC submitted, users would have the choice of up to 120 wideband channels of 50 kHz each or up to 3 broadband channels of 1.25 MHz each. As shown in that plan, each broadband deployment requires a guard band on each side of the wideband channel(s) to protect nearby narrowband voice operations or adjacent wideband operations. We do not to experience the same type of interference issues as occurred in the 800 MHz band. Considering the width of the broadband channel and the associated guard band required, deployment of broadband in a given area eliminates a significant number of wideband channels in that same area. When wideband technology is chosen, agencies have more options to plan and operate under either a dedicated or a shared system.

D. Interoperability

Interoperability is the key element in providing flexibility in the 700 MHz band. NACo and USCM were at the forefront, with the public safety community, in promoting a “hard date” to finalize the transition to digital television and return spectrum to public safety use. The Greenhouse Project in Pinellas County, Florida showed a great deal of promise and demonstrated that creative use of the 700 MHz band can provide public safety users with new and exciting technologies. Local elected officials are actively searching for interoperable solutions that meet the needs both horizontally within the jurisdiction and vertically between local, state

and federal officials – for both voice and data. Flexibility in the 700 MHz band is essential.

IV. Protection Of Public Safety Narrowband Voice Spectrum Is Essential

NPSTC has clearly and consistently stated the importance of maintaining and protecting the current allocation of narrowband channels in the 700 MHz band as the Commission reviews options for accommodating broadband deployments. NACo and USCM strongly support NPSTC in this position. We do not want a repeat of the problems in the 800 MHz band.

Significant progress has been made in the development and deployment of narrowband technologies in the 700 MHz band. Multiple regions have submitted and the FCC has approved 700 MHz plans.⁵ Indeed, all regions have initiated coordination efforts for the use of this band. Several regions have even begun deploying networks utilizing Project 25 Phase I equipment in the 700 MHz band. To date, the majority of this development has been for voice communications. Although all public safety communications are critical, voice communications are fundamental when public safety agencies respond to an emergency situation. Accordingly, the narrowband operations that are currently under development and that have already begun to be deployed must be protected from interference. Given the multi-year and multi-billion dollar process in which public safety and industry is currently engaged to help rid the 800 MHz band of

⁵ See, e.g., Wireless Telecommunications Bureau Approves Region 19 (New England) 700

MHz Regional Plan, Public Notice, 20 FCC Rcd 14375 (2005); Wireless Telecommunications

Bureau Approves Region 12 (Idaho) 700 MHz Regional Plan, Public Notice, 21 FCC Rcd 2382

(2006); *The Region 5 (Southern California) 700 MHz Regional Committee Proposed Public*

Safety Plan, Order, Public Notice, 19 FCC Rcd 8110 (2004) (approving Region 5's proposed 700

MHz plan); Comments Invited on Region 39 (Tennessee) 700 MHz Regional Planning Committee Public Safety Plan, Public Notice, Public Notice, 21 FCC Rcd 533 (2006); Comments Invited on Region 22 (Minnesota) Regional Planning Committee Public Safety Plan

and Request for Waiver, Public Notice, 21 FCC Rcd 312 (2006).

interference, it would be particularly ill advised not to take all reasonable steps to protect the 700 MHz voice band at the outset of broadband and wideband deployment.

A. Out-of-Band Emissions

Given the wider bandwidth, broadband emissions roll off more slowly than wideband emissions. One of the key reasons why the public safety community and TIA previously focused on wideband solutions for the 700 MHz public safety spectrum was its ability to be a good neighbor in a relatively small block of spectrum. Off-the-shelf broadband products developed for commercial operations typically are not as good a spectrum neighbor to the narrowband or wideband operations used by public safety because their emissions impact a larger number of adjacent channels.

For the record, NACo and USCM support the NPSTC proposed plan, which incorporates a 0.975 MHz guard band on either side of a broadband spectrum deployment. We note that guard bands might still be needed to protect a given voice receive site, even for cases in which a broadband or wideband transmitter is co-located with that receive site. As addressed in the section of these comments regarding coverage, broadband operation requires significantly more sites than voice, so such co-location throughout the service area is unlikely. In contrast, the wider coverage of wideband makes co-location with voice sites much more feasible. Therefore, the guard band is more essential with respect to the deployment of broadband technology.

B. Near-Far Interference

The larger number of sites required for broadband technology presents an additional interference challenge for public safety systems. One of the primary interference mechanisms that the Commission found in the 800 MHz band was interference due to a “near-far” effect. Near-far interference occurs when a receiver is in an area of relatively weak signal coverage from its intended site, but is experiencing a strong signal from an interfering site. In such a situation, the radio is overwhelmed by the interfering signal and is no longer able to differentiate its intended signal and the user cannot communicate.

One of the most effective solutions for resolving near-far interference is to collocate antennas so that the relative strength of both the desired and interfering

signals remains the same as a user moves through an area. Co-location is more readily accomplished when deploying wideband technologies because the coverage between a narrowband voice system and a TIA 902(SAM) wideband system can be closely matched for mobile coverage. The larger number of sites required for broadband coverage makes it impossible to co-locate all sites and increases the potential for users to experience near-far interference. This again illustrates the need to maintain flexibility for licensees to deploy either wideband or broadband technology and for the Commission to incorporate interference protection mechanisms in the rules.

C. Intermodulation Interference

Both broadband and wideband technologies have the potential to cause intermodulation interference to narrowband voice operations. Therefore system planning must consider the potential for intermodulation regardless of which technology is used. However, the intermodulation effects are different between wideband and broadband technologies, and related system architectures also play a role. With broadband, the span of potential intermodulation is much greater than that of wideband. Wideband on the other hand may have different levels of intermodulation, but the signal tends to be confined to several channels. Furthermore, it is far more likely that wideband systems will be co-located with narrowband voice systems at high elevation antenna sites which will significantly mitigate any effects from intermodulation interference.

Another phenomenon experienced in the 800 MHz interference between commercial and public safety systems is the difference that antenna height can make in the resultant potential for intermodulation interference. Systems that use a low site architecture generally place a higher level of signal in the vicinity surrounding the transmit antenna than that normally experienced from high site systems. This is often the case even though a low site transmitter may have a lower overall power level than a high site transmitter. This occurs because of typical antenna patterns used in low site systems and because there is additional path loss between a high site antenna and the ground compared to that of a low site antenna system. With a stronger interfering signal at ground level, mobile and portable units are more likely to experience intermodulation and overload interference. Again, such real life deployment considerations reinforce the

need for public safety to have flexibility in the technology and configuration of the systems deployed in the 700 MHz band.

V. Conclusion

For the reasons detailed above, the Commission should adopt NPSTC's proposed band plan for modifying the 700 MHz public safety band. This plan provides local elected officials and their public safety agencies a high degree of flexibility to tailor their communications networks to their needs. While broadband will provide benefits of higher overall data rates, particularly at locations near the base station antenna, it comes at the cost of installing and maintaining a far greater number of sites and therefore may prove to be cost prohibitive for coverage in suburban or rural areas and create planning and zoning issues for local officials. Accordingly, in any revised band plan, the Commission must provide licensees flexibility to choose between wideband and/or broadband technologies, not just on a regional basis but also within regions pursuant to plans developed by the RPCs. Such flexibility will provide local elected officials and their public safety entities the opportunity to choose technologies based on the most appropriate data solution, taking into account trade offs between data rate, coverage, cost requirements, and interference impact rather than a regulatory mandate as Lucent proposes.

NPSTC has also emphasized the need to protect narrowband voice operations and
Other commentors have provided some additional information herein that identifies steps to help provide that protection. Essential voice services that are being deployed in the 700 MHz narrowband channels provide the backbone of public safety communications and must be protected from interference.

Respectfully submitted,

National Association of Counties
The U.S. Conference of Mayors

By: Jeffrey D. Arnold
Deputy Legislative Director
National Association of

Counties

800

440 First Street, N.W.; Suite

Washington, D.C. 20001

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